REMARKS

I. Introduction

In response to the Office Action dated January 9, 2004, claims 1, 2, 12, 17 and 19 have been amended. Claims 1-3, 11-12 and 17-19 remain in the application. Re-examination and re-consideration of the application, as amended, is requested.

II. Claim Amendments

Applicants' attorney has made amendments to the claims as indicated above. These amendments were made solely for the purpose of clarifying the language of the claims, and were not required for patentability or to distinguish the claims over the prior art.

III. Non-Art Rejections

In paragraphs (1)-(2) of the Office Action, claims 1-3, 11, 12, and 17-19 were rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention.

Applicants' attorney has amended the claims to overcome this rejection. Moreover, Applicants' attorney respectfully submits that the term "grating phase" is well known in the art as the relative location of the physical (or structural) grating features (i.e., the location of the grating "teeth"). For example, Applicants' attorney submits herewith Figure 6.5 and associated text from L.A. Coldren et al., "Diode Lasers and Photonic Integrated Circuits," John Wiley & Sons, 1995, p. 274, which shows the use of the term "grating phase." (Note that this reference has been previously submitted in an Information Disclosure Statement, albeit citing other pages).

IV. Prior Art Rejections

A. The Office Action Rejections

On page (3) of the Office Action, claims 1, 12, and 17 were rejected under 35 U.S.C. §102(b) as being anticipated by Little et al., U.S. Patent No. 5,668,900 (Little). However, on page (4) of the Office Action, claims 2, 3, 11, 18, and 19 were indicated as being allowable if rewritten in independent form to include the base claim and any intervening claims.

Applicants' attorney acknowledges the indication of allowable claims, but respectfully traverse these rejections.

B. The Applicant's Independent Claims

Independent claim 1 is directed to an improved distributed Bragg reflector comprising:

a sampled grating, including a plurality of sampled grating portions having a first grating phase separated from each other by portions with no grating; and

a first grating burst portion, at a beginning of a first one of the sampled grating portions, having a second grating phase, wherein the second grating phase is different from the first grating phase.

Independent claim 17 is directed to a distributed Bragg reflector comprising:

a sampled grating, including a plurality of sampled grating portions separated from each other by portions with no grating;

wherein the sampled grating portions each have a first grating phase and a second grating phase.

C. The Little Reference

Little describes improvements in distributed feedback optical reflection filters. In particular, taper shapes for the optical reflection couplers are determined by a design method based on a variational optimization theory, to provide an out-of-band sidelobe suppression ratio of greater than -30 dB, and a reduced width of the filtered bandwidth for a specified side lobe suppression level.

D. The Applicant's Claims Are Patentable Over The References

Applicant's invention, as recited in independent claims 1 and 17, is patentable over the references, because the claims recite limitations not found in the references.

Specifically, with regard to independent claim 1, Figure 12d of Little does not teach or suggest a first grating burst portion, at a beginning of a first one of the sampled grating portions, having a second grating phase, wherein the second grating phase is different from the first grating phase of a plurality of sampled grating portions. Similarly, with regard to independent claim 17, Figure 12d of Little does not teach or suggest a sampled grating, including a plurality of sampled grating portions separated from each other by portions with no grating, wherein one or more of the sampled grating portions have a first grating phase and remaining ones of the sampled grating portions have a second grating phase.

Instead, Figure 12d of Little merely describes a sampled grating that includes a plurality of sampled grating portions or grating bursts separated from each other by portions with no grating. However, the sampled grating of Figure 12b would have been produced by a sampling function f(x) using only the values of 1 (grating) or 0 (no grating), but not –1, which indicates a sampled grating

portion having a phase opposite (i.e., different) that of another sampled grating portion having a value of 1. Consequently, Little does not teach or suggest Applicants' invention.

Moreover, the various elements of Applicants' claimed invention together provide operational advantages over Little. In addition, Applicants' invention solves problems not recognized by Little.

Thus, Applicants' attorney submits that independent claims 1 and 17 are allowable over Little. Further, dependent claims 2-3, 11-12, and 18-19 are submitted to be allowable over Little in the same manner, because they are dependent on independent claims 1, and 17, respectively, and thus contain all the limitations of the independent claims. In addition, dependent claims 2-3, 11-12, and 18-19 recite additional novel elements not shown by Little.

V. Conclusion

In view of the above, it is submitted that this application is now in good order for allowance and such allowance is respectfully solicited. Should the Examiner believe minor matters still remain that can be resolved in a telephone interview, the Examiner is urged to call Applicants' undersigned attorney.

Respectfully submitted,

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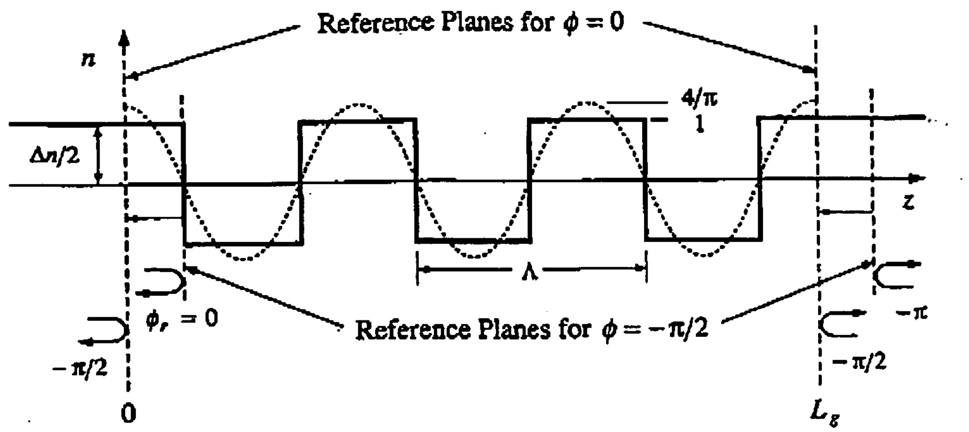

FIGURE 6.5 Illustration of reference planes used to define $z = 0$ and $z = L_g$ in a finite-length grating. The coupled-mode equations assume the index profile has a Fourier component that varies as $\cos(2\beta_0 z - \phi)$. The first set of reference planes are drawn for $\phi = -\pi/2$ which aligns the $z = 0$ plane with an index down step of a square wave grating (these are the reference planes assumed in Chapter 3). The second set shifts the planes to the left for a more symmetric placement by setting $\phi = 0$.

real, positive, and symmetrical Fourier coefficients.) Equation (6.37) shows that at the Bragg frequency, the reflection coefficient has a phase of $-\pi/2$ referenced to this plane. Figure 6.5 illustrates this choice of reference planes and its correspondence to a square wave index grating, for which the reflection phase is more obvious. That is, at the Bragg frequency, where all reflection components add in phase, we know that the reflection phase from a square wave grating must be zero referenced to an index down step. The first Fourier component of this grating has a zero crossing at this point and is a maximum one quarter-wave back. Thus, for a reference plane placed at this maximum of the first Fourier component, the grating phase would be $-\beta\Lambda/2 = -\pi/2$.

More generally, the reflection phase, ϕ_r, of waves incident from the left is determined by $-j\kappa_{-l} \propto -je^{-j\phi}$ at the $z = 0$ plane, for a lossless grating at the Bragg frequency. For waves incident from the right, ϕ_r is determined by $-j\kappa_l e^{-2j\beta_0 L_g} \propto -je^{j\phi}e^{-2j\beta_0 L_g}$ at the $z = L_g$ plane. These reflection phases are shown in Fig. 6.5 for two different choices of the grating phase, ϕ, and a grating with $L_g = m\Lambda$. When combining a grating with other elements, the symmetric reference planes are a convenient choice. To use them, we adjust the input plane to a cosine peak by setting $\phi = 0$. However if $L_g \neq m\Lambda$, the output plane will not coincide with a cosine peak if it is placed at L_g. To retain the symmetry, we must shift the output plane slightly to create a reference plane separation of $L_r = m\Lambda$. This is accomplished by adding a phase delay, $e^{-2j\beta(L_r - L_g)}$, to the reflection phase from the right. The total reflection phase from the right then becomes $-je^{j\phi}e^{-2j\beta_0 L_r}e^{-2j\delta(L_r - L_g)} \approx -je^{j\phi}$, where the approximation holds for $L_r \sim L_g$, or $\delta = 0$. In practice then, for any grating length, the reflection phase at the Bragg frequency can be set to $-\pi/2$ from